WHAT IS CLAIMED IS:

1. An overload protection apparatus for protecting an engine-generator set from damage, the overload protection apparatus including:

a load power sensing circuit, including an input configured for coupling to an engine-generator set load, and an output providing a load power signal measuring an indication of power delivered from the engine-generator set to the load; and

a voltage regulator circuit, including an output configured for coupling to a control input of a generator exciter circuit to control a voltage delivered from a generator to the load, and including an input coupled to the load power sensing circuit output to receive the measured load power indication, the voltage regulator configured to decrease a magnitude of the voltage delivered from the engine-generator set to the load when the measured load power indication reaches a predetermined maximum value to substantially prevent the load power delivered from the engine-generator set to the load from exceeding a maximum load power value.

2. The apparatus of claim 1, in which the load power sensing circuit includes:

a load voltage sensing circuit, including an input configured to be coupled to the load, and an output providing a load voltage signal indicative of a load voltage;

a load current sensing circuit, including an input configured to be coupled to the load, and an output providing a load current signal indicative of the load current; and

a load power calculation circuit, including a first input coupled to the load voltage sensing circuit output to receive the load voltage signal, and a second input coupled to the load current sensing circuit output to receive the load current signal, and coupled to the load power sensing circuit output to provide the load power signal based on a multiplication of the load voltage signal and the load current signal and a power factor calculated using a phase angle between the load voltage signal

and the load current signal.

3. The apparatus of claim **1**, further including a load voltage sensing circuit, including an input configured to be coupled to the load, and an output providing a load voltage signal indicative of a load voltage, and in which the voltage regulator circuit includes:

a voltage reference circuit, including an output providing a reference voltage; and

a first difference circuit, including a first input coupled to the output of the voltage reference circuit to receive the reference voltage, a second input coupled to the output of the voltage sensing circuit to receive the load voltage signal, and a third input coupled to the output of the load power sensing circuit to receive a signal based on the load power signal, the first difference circuit also including an output providing a first difference signal indicative of a difference between the load voltage signal and a sum of the reference voltage and the signal based on the load power signal.

4. The apparatus of claim **3**, in which the voltage regulator further includes a first PID regulator, the first PID regulator including an input coupled to the output of the first difference circuit to receive the first difference signal, the first PID regulator including an output coupled to the control input of the generator exciter circuit to control the voltage delivered from the generator to the load.

5. The apparatus of claim **3**, further including:

a power reference circuit, including an output providing a reference power; and

a second difference circuit, including a first input coupled to the output of the power reference circuit to receive the reference power, a second input coupled to the output of the load power sensing circuit to receive the load power signal, the

second difference circuit also including an output providing a second difference signal indicative of a difference between the reference power and the load power signal.

6. The apparatus of claim **5**, further including a second PID regulator, the second PID regulator including an input coupled to the output of the second difference circuit to receive the second difference signal, the second PID regulator including an output coupled by a switch to the third input of the first difference circuit.

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7. The apparatus of claim **6**, in which the switch is configured to conduct only when the load power signal indicates that the load power equals or exceeds the maximum load power value.

8. The apparatus of claim **6**, in which the switch is configured to close when the load power exceeds a predetermined upper hysteresis point that incrementally exceeds the maximum load power value, and in which the switch is configured to open when the load power falls below a predetermined lower hysteresis point that is incrementally less than the maximum load power value.

9. The apparatus of claim **8**, in which the second PID regulator includes a clamping circuit that outputs a negative voltage to the third input of the first difference circuit when the load power falls below the maximum load power value but exceeds the predetermined lower hysteresis point.

10. The apparatus of claim **1**, in which the voltage regulator circuit includes:

a load voltage sensing circuit, including an input configured to be coupled to the load, and an output providing a load voltage signal indicative of a load voltage; and

a voltage reference circuit, including an input coupled to the load power sensing circuit output, and an output providing a reference voltage, in which the reference voltage is substantially constant when the measured load power indication is below the predetermined maximum value, and in which the reference voltage varies when the measured load power indication reaches or exceeds the predetermined maximum value.

11. An engine generator set including:

an engine;

a generator, mechanically coupled to and driven by the engine, the generator including an output configured to be coupled to a load for providing electrical power signal to the load, the generator including a generator exciter circuit controlling a load voltage of the electrical power signal provided to the load using a signal received at a generator exciter circuit control input;

a load power sensing circuit, including an input configured for coupling to the load, and an output providing a load power signal measuring an indication of power delivered from the generator to the load; and

a voltage regulator circuit, including an output configured for coupling to the generator exciter circuit control input to control the load voltage, and including an input coupled to the load power sensing circuit output to receive the measured load power indication, the voltage regulator circuit configured to decrease a magnitude of the load voltage when the measured load power indication reaches a predetermined maximum value to substantially prevent the load power delivered from the engine-generator set to the load from exceeding a maximum load power value.

12. The apparatus of claim 11, in which the load power sensing circuit includes:

a load voltage sensing circuit, including an input configured to be coupled to the load, and an output providing a load voltage signal indicative of the load voltage;

a load current sensing circuit, including an input configured to be coupled to

the load, and an output providing a load current signal indicative of the load current; and

a load power calculation circuit, including a first input coupled to the load voltage sensing circuit output to receive the load voltage signal, and a second input coupled to the load current sensing circuit output to receive the load current signal, and coupled to the load power sensing circuit output to provide the load power signal based on a multiplication of the load voltage signal and the load current signal and a power factor calculated using a phase angle between the load voltage signal and the load current signal.

13. The apparatus of claim **11**, further including a load voltage sensing circuit, including an input configured to be coupled to the load, and an output providing a load voltage signal indicative of the load voltage, and in which the voltage regulator circuit includes:

a voltage reference circuit, including an output providing a reference voltage; and

a first difference circuit, including a first input coupled to the output of the voltage reference circuit to receive the reference voltage, a second input coupled to the output of the voltage sensing circuit to receive the load voltage signal, and a third input coupled to the output of the load power sensing circuit to receive a signal based on the load power signal, the first difference circuit also including an output providing a first difference signal indicative of a difference between the load voltage signal and a sum of the reference voltage and the signal based on the load power signal.

14. The apparatus of claim **13**, in which the voltage regulator further includes a first PID regulator, the first PID regulator including an input coupled to the output of the first difference circuit to receive the first difference signal, the first PID regulator including an output coupled to the control input of the generator exciter circuit to

control the voltage delivered from the generator to the load.

15. The apparatus of claim **13**, further including:

a power reference circuit, including an output providing a reference power; and

a second difference circuit, including a first input coupled to the output of the power reference circuit to receive the reference power, a second input coupled to the output of the load power sensing circuit to receive the load power signal, the second difference circuit also including an output providing a second difference signal indicative of a difference between the reference power and the load power signal.

16. The apparatus of claim **15**, further including a second PID regulator, the second PID regulator including an input coupled to the output of the second difference circuit to receive the second difference signal, the second PID regulator including an output coupled by a switch to the third input of the first difference circuit, the switch configured to conduct only when the load power signal indicates that the load power equals or exceeds the maximum load power value.

17. The apparatus of claim **11**, in which the voltage regulator circuit includes:

a load voltage sensing circuit, including an input configured to be coupled to the load, and an output providing a load voltage signal indicative of a load voltage; and

a voltage reference circuit, including an input coupled to the load power sensing circuit output, and an output providing a reference voltage, in which the reference voltage is substantially constant when the measured load power indication is below the predetermined maximum value, and in which the reference voltage varies when the measured load power indication reaches or exceeds the predetermined maximum value.

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18. A method of generating AC electrical power and delivering the electrical power to a load, the method including:

sensing a load power delivered by an engine-generator set to a load;

determining whether the delivered load power has reached a maximum load power value; and

if the delivered load power has reached a maximum load power value, then decreasing a load voltage to clamp the load power about the maximum load power value.

19. The method of claim **18**, in which determining whether the delivered load power has reached a maximum load power value includes:

comparing the load power to a reference power value; and

computing a difference between the load power and the reference power value.

20. The method of claim **19**, further including computing a PID control signal using the difference between the load power and the reference power value.

21. The method of claim **19**, further including switching in a load power control feedback loop when the load power exceeds the reference power value.

22. The method of claim **18**, in which decreasing the load voltage to clamp the load power includes controlling a generator excitation voltage.

23. The method of claim **18**, further including:

using a load voltage feedback control loop to control the load voltage about a substantially constant value when the load power is below the maximum load power value; and

using a load power feedback control loop to substantially prevent the load power from exceeding the maximum load power value, including coupling into the load voltage feedback control loop to reduce the load voltage when the load power reaches the maximum load power value.

24. The method of claim **18**, further including:

using a load voltage feedback control loop to control the load voltage about a substantially constant value when the load power is below the maximum load power value; and

using a load power feedback control loop to substantially prevent the load power from exceeding the maximum load power value, including activating the load power feedback control loop to reduce the load voltage when the load power reaches the maximum load power value.

25. The method of claim **23**, further including generating a PID control signal based on a difference between the load voltage signal and a sum of the reference voltage and a signal based on a difference between a reference power and the load power.

26. The method of claim **23**, in which activating the load power feedback control loop includes switchably coupling the load power feedback control loop into the load voltage feedback control loop.